Paper No. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte OSAMU KITAKAMI
and HIROSHI HIRANO

Appeal No. 1998-1658
Application 08/343,876[1]

ON BRIEF

Before HAIRSTON, BARRETT, and BARRY, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1, 4-8, and 11-14.

[1] Application for patent filed November 17, 1994, entitled "Magnetic Recording And Reproducing System Including A Ring Head Of Materials Having Different Saturation Flux Densities," which is a continuation of Application 07/910,564, filed July 8, 1992, now abandoned, which claims the foreign filing priority benefit under 35 U.S.C. § 119 of Japanese Application 3-195743, filed July 10, 1991.

We affirm-in-part.

BACKGROUND

The disclosed invention relates to a magnetic recording and reproducing system. The recording medium has substantially oblique magnetic anisotropy with a principal axis of magnetic anisotropy of 10° to 80° from the recording surface. The head is a Metal-In-Gap (MIG) type ring head with a high saturation magnetic flux density material only on one side of the gap portion (a "one-side MIG head"). When the one-side MIG head is run in a "normal direction," as shown in figure 1A, the high saturation magnetic flux density material 2 is on the leading gap edge, the low saturation flux density material 1 is on the trailing edge, and the principal axis of magnetic anisotropy is tilted toward the leading gap edge. This arrangement provides improved recording characteristics.

Claim 1 is reproduced below.[2]

> 1. A magnetic recording and reproducing system which exhibits excellent recording characteristics in recording media having substantially uniaxial oblique magnetic anisotropy with respect to a recording surface of said media, which comprises a recording medium and a recording and reproducing ring head including a gap portion having a leading gap edge and a trailing gap edge, said ring head having a high saturation magnetic flux density material provided only on one side of said gap portion run in a normal direction with respect to said magnetic recording medium, said one side of said gap portion forming said

[2] Note that "principle axis" should be "principal axis" in claims 1 and 8.

leading gap edge in a running direction of said ring head, thereby to carry out recording and/or reproducing;

wherein said leading gap edge of high saturation magnetic flux density material has a saturation magnetic flux density of at least 1.2 times that of a low saturation magnetic flux density material of said trailing gap edge; and

wherein a substantial direction of a principle [sic] axis of said magnetic anisotropy rises by 10-80° from said recording surface of said recording medium.

The Examiner relies on the following prior art:

Shimizu et al. (Shimizu '178)	4,587,178	May 6, 1986
Okuda et al. (Okuda)	4,953,049	August 28, 1990
Yokoyama et al. (Yokoyama)	5,140,486	August 18, 1992 (filed November 14, 1990)
Shimizu et al. (Shimizu '645)	5,155,645	October 13, 1992 (filed November 13, 1990)
Kobayashi et al. (Kobayashi)	5,212,612	May 18, 1993 (filed February 6, 1991)

Claims 1, 4-6, 8, and 11-13 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Shimizu '178 and Kobayashi.

Claims 7 and 14 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Shimizu '178 and Kobayashi as applied in the rejection of claim 1, further in view of Yokoyama.

Claims 1, 4-6, 8, and 11-13 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Shimizu '178 and Shimizu '645.

Claims 7 and 14 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Shimizu '178 and Shimizu '645 as applied in the rejection of claim 1, further in view of Yokoyama.

Claims 1, 4-6, 8, and 11-13 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Shimizu '178 and Okuda.

Claims 7 and 14 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Shimizu '178 and Okuda as applied in the rejection of claim 1, further in view of Yokoyama.

We refer to the Final Rejection (Paper No. 17) (pages referred to as "FR__") and the Examiner's Answer (Paper No. 24) (pages referred to as "EA__") for a statement of the Examiner's position, and to the Appeal Brief (Paper No. 23) (pages referred to as "Br__") and the Reply Brief (Paper No. 25) (pages referred to as "RBr__") for Appellants' arguments thereagainst.

OPINION

Only argued limitations are addressed

We confine our analysis to issues and differences argued in the brief. Under U.S. Patent and Trademark Office rules, an appellant's brief is required to describe how the claims distinctly claim the invention and to specify the particular limitations in the rejected claims which are not described in the prior art or rendered obvious over the prior art. See 37 CFR § 1.192(c)(8)(iv). Cf. In re Baxter Travenol Labs., 952 F.2d 388, 391, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991) ("It is not the function of this court to examine the claims in greater detail than argued by an appellant, looking for nonobvious distinctions over the prior art."); In re Wiechert, 370 F.2d 927, 936, 152

USPQ 247, 254 (CCPA 1967) ("This court has uniformly followed the sound rule that an issue raised below which is not argued in this court, even if it has been properly brought here by a reason of appeal, is regarded as abandoned and will not be considered. It is our function as a court to decide disputed issues, not to create them."); In re Wiseman, 596 F.2d 1019, 1022, 201 USPQ 658, 661 (CCPA 1979) (arguments must first be presented to the Board before they can be argued on appeal).

Claim interpretation

Initially, claims 1 and 8 do not appear to define the direction of the principal axis of the magnetic anisotropy with respect to the running direction of the recording medium. Appellants' figures 1A and 1B show the "normal direction" and "reverse direction" with respect to the inclination of the principal axis of magnetic anisotropy. However, the limitation "run in a normal direction with respect to said magnetic recording medium" in claim 1 is not defined and can be interpreted broadly as the direction of the head relative to the tape during normal recording and/or reproducing. Similarly, the limitation "normal running direction of said recording medium" in claim 8 is not defined and can be interpreted broadly as the direction of the recording medium relative to the head during normal recording and/or reproducing. That is, it is known that

heads can reproduce signals when traversing in a reverse direction, e.g., reversing when playing a video tape, but this is not the "normal direction" for recording and/or reproducing. Claim 1 recites "wherein a substantial direction of a principle [sic] axis of said magnetic anisotropy rises by 10-80° from said recording surface of said recording medium," but does not state the orientation of the axis with respect to the running direction. Claim 8 is similar. Limitations are not to be read into the claims. See In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) (explaining the policies for the broadest reasonable interpretation and not reading limitations into the claims).

Issue (1): Claims 1, 4-6, 8, and 11-13
Shimizu '178 and Kobayashi

Shimizu '178 discloses a magnetic recording medium in which an undercoat layer is formed by oblique-incidence vacuum evaporation of cobalt or a cobalt alloy, which is presumed to produce a magnetic layer having substantially uniaxial oblique magnetic anisotropy with respect to a recording surface of the medium. Since the cobalt or alloy thereof is evaporated at an incident angle with respect to the support of 10° to 90° (col. 2, lines 50-57), the principal axis of magnetic anisotropy is considered to be 10° to 80° from the surface, as recited in claims 1 and 8. Shimizu '178 has a second layer formed by a wet

plating technique on top of the undercoat layer (col. 4, lines 35-40); claims 1 and 8 do not preclude the presence of such a second layer. Appellants do not contest that Shimizu '178 discloses a magnetic recording medium as claimed. In any case, it is admitted that oblique magnetic anisotropy thin film media were known (specification, p. 1, line 23 to p. 2, line 7).

Kobayashi, figure 5, discloses a one-side-deposited MIG head having a metal film 2 with high saturation flux density, for example, Co amorphous or sendust only on one gap edge (col. 3, lines 22-26). The running direction of the tape is indicated by the arrow 21, which shows that the metal film 2 is formed on the trailing side of the magnetic tape (col. 4, lines 40). Such a one-side-deposited MIG head represents superior playback characteristics to that of a both-sides-deposited MIG head (col. 4, lines 47-51). Kobayashi does not mention the type of recording medium used.

The Examiner finds (EA5): "Figure 5 of Kobayashi et al shows a head running in a normal direction with respect to the magnetic recording medium with a high saturation magnetic flux density material forming a leading gap edge by way of arrow 21."

Appellants argue that Kobayashi discloses the metal film of high saturation flux density is provided at the trailing side of the magnetic tape, which is contrary to the present invention (Br6).

We agree with Appellants that Kobayashi discloses the tape running in the opposite direction from what is claimed. The arrow 21 in figures 5 and 6 represents the running direction of the tape (col. 3, lines 10-11), not the head. Further, Kobayashi expressly discloses that the metal film with high saturation flux density is formed at the trailing side (col. 4, lines 38-40). The rejection fails to address this difference. Accordingly, the Examiner fails to establish a prima facie case of obviousness. The rejection of claims 1, 4-6, 8, and 11-13 is reversed.

Issue (2): Claims 7 and 14
Shimizu '178, Kobayashi, and Yokoyama

Yokoyama discloses a magnetic recording and reproducing process. The magnetic recording layer has a coercive force of at least 1100 Oe and the flying magnetic head, which may be a MIG type or thin film type, has a gap adjoining portion made of a soft magnetic material having a saturation magnetic flux density of at least 0.7 T (col. 2, lines 6-27). The magnetic layer is composed of ferromagnetic submicron particles, such as Fe (col. 3, lines 44-50), where "needle shaped particles offering configurational magnetic anisotropy are preferred" (col. 3, lines 60-63). The particles are mixed together with a binder (col. 4, lines 8-18).

Yokoyama does not cure the deficiency of Shimizu '178 and Kobayashi with respect to the location of the high saturation

magnetic flux density material on the leading gap edge as recited in claims 1 and 8. Accordingly, the rejection of claims 7 and 14 is reversed.

Issue (3): Claims 1, 4-6, 8, and 11-13
Shimizu '178 and Shimizu '645

The contents of Shimizu '178 are discussed under Issue (1).

Shimizu '645, figure 1, discloses a MIG head having magnetic core halves 11a and 11b of Mn-Zn ferrite with first ferromagnetic metal thin films 13a and 13b of high saturation flux density material, such as Fe-Si-Aρ, on the core halves opposing each other to form the gap 12 and second ferromagnetic metal thin films 17a and 17b, such as Fe-Si-Aρ alloy of different composition, on the first ferromagnetic metal thin films 13a and 13b (col. 4, lines 20-44). The first ferromagnetic metal thin film may be sendust (col. 8, lines 49-53). The ratio B_{S2}/B_{S1} of the saturation flux density B_{S2} of the second ferromagnetic thin films 17a and 17b to the saturation flux density B_{S1} of the first ferromagnetic metal thin films 13a and 13b should be less than 0.6 (col. 2, lines 59-61; col. 5, lines 16-26 and 45-48; col. 7, lines 10-18). Shimizu '645 discloses that the first and second ferromagnetic metal thin films 13a and 17a may be formed on only one magnetic core half 11a, as shown in figure 8 (col. 8, lines 16-21). Shimizu '645 does not disclose the direction of

movement of the head relative to the tape. Shimizu '645 does not describe the recording media.

Appellants argue that the magnetic head in Shimizu '645 has a structure which is different from the recording heads recited in the instant invention (Br9-10). It is argued that Shimizu '645 shows metal thin films having low saturation magnetic flux density provided on both sides of the head gap, and subsequently, metal thin films having high saturation magnetic flux density are provided on both thus formed metal thin films having low magnetic flux density (Br9).

Unfortunately, the Examiner does not address Appellants' argument that the head structure is different. Appellants err in not addressing the Examiner's reliance on Shimizu '645, figure 8, as showing high saturation magnetic flux density material 13a on only one side of the gap (FR6). Appellants err in stating that the high saturation flux density material is deposited on a low saturation flux density material: the layers are deposited in the opposite order. The material of the first thin film 13a has a high saturation flux density (col. 4, lines 24-29) B_{S1} of 10000 gauss (col. 4, lines 46-49). The second thin film 17a deposited on the first thin film 13a has a preferred saturation flux density B_{S2} of less than $0.6B_{S2}$ (less than 6000) because the preferred ratio B_{S2}/B_{S1} is less than 0.6 (col. 7, lines 10-18). It is known that the saturation flux density of ferrite is only

5500 gauss at most (Okuda, col. 1, lines 31-32). The Examiner's statement that Shimizu '645 has "high saturation magnetic flux density material 17a only on one side of gap 12" (FR6; EA7), fails to recognize that thin film 17a has a preferred lower saturation flux density than thin film 13a and fails to address how the second ferromagnetic thin film 17a affects the rejection. Appellants point to the lower saturation magnetic flux density material, but do not point out how the claims patentably define thereover. We have studied claims 1 and 8 and conclude that because the claims are "open-ended" they do not preclude the presence of the additional layer of a low saturation magnetic flux density material 17a. Thus, we find that Shimizu '645 meets the head limitations of claims 1 and 8. Further, it would have been obvious to one of ordinary skill in the art that the saturation magnetic flux density of second thin film 17a could be made equal to that of the first thin film 13a, as shown by figure 3, if the advantages of the lower saturation flux density of thin film 17a was not desired. Still further, if thin film 17a had a saturation magnetic flux density of 6000 gauss and the ferrite had a saturation magnetic flux density of slightly less than 5000 gauss (noting that Okuda discloses that 5500 gauss is a maximum value for ferrite), the thin film 17a would have a saturation flux density of more than 1.2 times the saturation magnetic flux density of the other gap edge, as claimed.

We find that Shimizu '178 discloses a recording media, as claimed, and that Shimizu '645 discloses a head, as claimed. As to whether it would have been obvious to combine the recording media of Shimizu '178 with the head of Shimizu '645, Appellants argue that the combined disclosures fail to provide for a magnetic recording and reproducing system like that claimed, and also fail to provide any motivation to prepare the same (Br10). The Examiner responds that all the references are within the same field of endeavor, dynamic magnetic recording/reproducing, and a person of ordinary skill in the art would have been motivated to utilize the magnetic recording medium of Shimizu '178 with the head of Shimizu '645 to prevent a high frequency bias from being recorded (EA12).

We do not see where the Examiner obtained his reasoning about preventing a high frequency bias from being recorded. Nevertheless, we conclude that one of ordinary skill in the magnetic recording art would have been motivated to use the head of Shimizu '645 with any known recording medium, such as Shimizu '178, because heads are known to be used with widely diverse types of recording media. In particular, Shimizu '645 describes a head for video recording (col. 1, lines 8-12) and Shimizu '178 describes a recording medium for use in video tapes (col. 1, lines 6-10), which is sufficient to suggest they could be used together. Furthermore, Appellants admit that MIG heads

and obliquely vapor deposited tape have been used in combination (specification, p. 2, lines 13-18).

The other obviousness question is whether it would have been obvious to run the head in Shimizu '645, figure 8, in a direction relative to the tape in Shimizu '178 so that the high saturation magnetic flux density material 13a is on the leading gap edge, because no direction is specified in Shimizu '645. The Examiner states that the head of Shimizu '645 is considered to run in a normal direction with respect to the magnetic recording medium with the high saturation magnetic flux density material forming a leading gap edge (EA7), but provides no reasoning for this finding. Nevertheless, there are only two ways the head could be mounted for recording and reproducing, with the high saturation magnetic flux density material on the leading gap edge or on the trailing gap edge, and we see no reason why it would not have been obvious to one of ordinary skill in the art to mount the head in either orientation. Since claims 1 and 8 do not specifically recite the orientation of the principal axis of the magnetic anisotropy of the recording media relative to the normal running direction of the head, there can be no argument that the claimed subject matter achieves an unexpected result by the relationship between the principal axis of the magnetic anisotropy and the head as shown in Appellants' figure 1A.

Appellants argue that Shimizu '178 is completely silent on the use of a magnetic head like that used in the claimed invention (Br10). The Examiner responds that one cannot show non-obviousness by attacking references individually where, as here, the rejection is based on a combination of references (EA11). Appellants reply that they did argue against the combination of references and are not solely arguing the teachings of the references separately (RBr2).

We agree with the Examiner that the arguments about what is missing from each individual reference is an attack on the references individually. One cannot show non-obviousness by attacking the references individually where the rejection is based on a combination of references. In re Merck & Co., 800 F.2d 1091, 1097, 231 USPQ 375, 380 (Fed. Cir. 1986). It is unpersuasive to argue that Shimizu '178 does not teach a magnetic head like that claimed when it is not being relied on for that teaching. The lack of teachings in an individual reference is relevant to the overall question of motivation, but we conclude that one skilled in the art would have been motivated to combine the head with the tape because both are used for video recording.

For the reasons discussed above, we conclude the combination of Shimizu '178 and Shimizu '645 is sufficient to establish a prima facie case of obviousness, which has not been rebutted. The rejection of claims 1, 4-6, 8, and 11-13 is sustained.

Issue (4): Claims 7 and 14
Shimizu '178, Shimizu '645, and Yokoyama

The contents of Yokoyama are discussed under Issue (2).

The Examiner concludes that it would have been obvious to modify the recording medium of Shimizu '178 with the coating taught by Yokoyama (EA10-11):

> The rationale is as follows: One of ordinary skill in the art would have been motivated to coat a magnetic recording medium with a binder having a dispersion of magnetic fine particles comprising Fe as taught by Yokoyama et al to offer a configurational magnetic anisotropy in the magnetic recording medium; see Yokoyama et al, column 3, lines 60-68.

Appellants argue that Yokoyama does not suggest a magnetic head having a high saturation magnetic flux density material provided only on one side of the gap portion, or a media having substantially uniaxial oblique magnetic anisotropy with respect to a recording surface of the medium (Br11).

Yokoyama is not relied on for the head construction, so the fact that it does not teach a one-side MIG head is irrelevant.

We find no suggestion to modify Shimizu '178 in view of Yokoyama as stated by the Examiner. Shimizu '178 provides a magnetic material with substantially uniaxial oblique magnetic anisotropy by oblique-incidence vacuum evaporation of a cobalt alloy. There is no suggestion to modify this step by using Fe in a binder, which is a completely different kind of fabrication step that is inconsistent with the vacuum evaporation step of

Shimizu '178, or that using Fe in a binder would produce a media having substantially uniaxial oblique magnetic anisotropy. The needle shaped particles in Yokoyama may offer "configurational magnetic anisotropy," but this does not teach substantially uniaxial oblique magnetic anisotropy. Thus, we conclude that the Examiner has failed to establish a prima facie case of obviousness. The rejection of claims 7 and 14 is reversed.

Issue (5): Claims 1, 4-6, 8, and 11-13
Shimizu '178 and Okuda

For the purpose of any judicial review of this decision, we consider this to be the best rejection.

The contents of Shimizu '178 are discussed under Issue (1).

Okuda discloses that composite magnetic heads having a material with a thin film of ferromagnetic metal, such as sendust, having a high saturation flux density formed near the magnetic gap were known in the prior art (col. 1, lines 28-59). Okuda discloses an improvement to suppress generation of so-called "pseudo gaps" whereby the ferromagnetic metal 11a is formed on a heat-resistant thin film 10a (e.g., abstract). Okuda, figure 7H, shows a head including a gap 12 and a ferromagnetic metal thin film 11a on only one edge of the gap (col. 7, lines 37-40). The thin film 11a may be "sendust alloy, permalloy alloy, Fe-Al alloy, Fe-Co alloy, Fe-Si alloy, Fe-C alloy, or metal-metal or metal-metalloid amorphous alloy"

(col. 6, lines 33-35), which are known to have a high saturation flux density (col. 1, lines 33-46). We find that the head structure of Okuda meets the limitations of the head in claims 1 and 8. However, Okuda does not disclose the direction of movement of the head relative to the tape and does not disclose the magnetic recording material.

Appellants argue that Okuda has a structure that is different from that of recording heads recited in the instant invention (Br12).

We disagree. Appellants do not explain how the head structure in Okuda is different from that which is claimed. The structure of the head in Okuda meets the claim requirements for a head having a gap edge of high saturation magnetic flux density material which is at least 1.2 times that of a low saturation magnetic flux density material of the other gap edge.

We find that Shimizu '178 discloses a recording media, as claimed, and that Okuda discloses a head, as claimed. As to whether it would have been obvious to combine the recording media of Shimizu '178 with the head of Okuda, Appellants argue that the combined disclosures fail to provide for a magnetic recording and reproducing system like that claimed, and also fail to provide any motivation to prepare the same (Br12). The Examiner responds that all the references are within the same field of endeavor, dynamic magnetic recording/reproducing, and therefore a

person of ordinary skill in the art would have been motivated to utilize the magnetic recording medium of Shimizu '178 with the head of Okuda to prevent a high frequency bias from being recorded (EA12).

We do not see where the Examiner obtained his reasoning about preventing a high frequency bias from being recorded. Nevertheless, we conclude that one of ordinary skill in the magnetic recording art would have been motivated to use the heads of Okuda with any known recording medium, such as Shimizu '178, because heads are known to be used with widely diverse types of recording media. In particular, Okuda describes a head for video recording (col. 1, lines 7-12) and Shimizu '178 describes a recording medium for use in video tapes (col. 1, lines 6-10), which is sufficient to suggest they could be used together. Furthermore, Appellants admit that MIG heads and obliquely vapor deposited tape have been used in combination (specification, p. 2, lines 13-18).

The other obviousness question is whether it would have been obvious to run the head in Okuda, figure 7H, in a direction relative to the tape in Shimizu '178 so that the high saturation magnetic flux density material 13a is on the leading gap edge, because no direction is specified in Okuda. The Examiner states that the head of Okuda is considered to run in a normal direction with respect to the magnetic recording medium with the high

saturation magnetic flux density material forming a leading gap edge (EA9), but provides no reasoning for this finding. Nevertheless, there are only two ways the head could be mounted for recording and reproducing, with the high saturation magnetic flux density material on the leading gap edge or on the trailing gap edge, and we see no reason why it would not have been obvious to one of ordinary skill in the art to mount the head in either orientation. Since claims 1 and 8 do not specifically recite the orientation of the principal axis of the magnetic anisotropy of the recording media relative to the normal running direction of the head, there can be no argument (and none has been made) that the claimed subject matter achieves an unexpected result by the relationship between the principal axis of the magnetic anisotropy and the head as shown in Appellants' figure 1A.

Appellants argue that Shimizu '178 is completely silent on the use of a magnetic head like that used in the claimed invention and that Okuda is silent on magnetic anisotropy of a magnetic film (Br12). As stated in connection with Issue (3), we agree with the Examiner that the arguments about what is missing from each individual reference is an attack on the references individually. It is unpersuasive to argue that Shimizu '178 does not teach the claimed magnetic head when Okuda is relied on for this feature and, likewise, it is unpersuasive to argue that

Okuda does not teach the magnetic recording media when Shimizu '178 is relied on for this feature.

For the reasons discussed above, we conclude the combination of Shimizu '178 and Okuda is sufficient to establish a prima facie case of obviousness, which has not been rebutted. The rejection of claims 1, 4-6, 8, and 11-13 is sustained.

Issue (6): Claims 7 and 14
Shimizu '178, Okuda, and Yokoyama

The rejection of claims 7 and 14 is reversed for the reasons stated in the discussion of Issue (4).

CONCLUSION

The rejections of claims 1, 4-6, 8, and 11-13 over Shimizu '178 in view of Shimizu '645 and Shimizu '178 in view of Okuda are sustained. The rejection of claims 1, 4-6, 8, and 11-13 over Shimizu '178 and Kobayashi is reversed.

The rejections of claims 7 and 14 are reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

KENNETH W. HAIRSTON Administrative Patent Judge	)	
LEE E. BARRETT Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
LANCE LEONARD BARRY Administrative Patent Judge	)	

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